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Continuous 900-megahertz electromagnetic field applied in middle and late-adolescence causes qualitative and quantitative changes in the ovarian morphology, tissue and blood biochemistry of the rat

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Abstract

Purpose: The purpose of this study was to use histological and biochemical methods in order to evaluate changes taking place in the ovarian of rats exposed to the effect of a 900-megahertz (MHz) electromagnetic field (EMF) in middle and late adolescence.

assigned equally to control, sham and EMF groups. EMF group rats were exposed to the effect of a 900-MHz EMF for 1 h a day, at the same time every day between postnatal days 35 and 59, while inside an EMF cage. Sham group rats were kept inside the EMF cage for the same time between postnatal days 35 and 59 without being exposed to any EMF effect. At the end of the study, rats' ovarian were removed and blood specimens were taken. Right ovarium tissues were subjected to routine histological procedures and stained with hematoxylin and eosin, periodic acid shift and Masson's trichrome. Follicles were counted in ovarian sections stained with hematoxylin and eosin. The TUNEL method was used to evaluate apoptosis. Left ovarian tissue and blood specimens were investigated biochemically.

Results: Histopathological examination of EMF group ovarian tissue revealed thinning in the zona granulosa and theca layers, shrinking in granulosa cells, reduced mitotic activity and leukocyte infiltration in the follicles and stroma. Secondary follicle numbers in the EMF group were significantly lower than in the other groups. In terms of biochemistry, EMF and sham group superoxide dismutase, catalase and anti-Mullerian hormone levels and EMF group 3-nitrotyrosine values increased significantly compared to the control group. EMF and sham group serum catalase and 8-hydroxy-deoxiguanosine values increased significantly compared to the control group, and EMF group total oxidant status and oxidative stress index values were significantly higher compared to the sham and control groups.

Conclusions: A total of 900-MHz EMF applied in middle and late adolescence may cause changes in the morphology and biochemistry of the rat ovarium.

Keywords: Electromagnetic field middle and late adolescence ovarium rat

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Disclosure statement

The authors report no conflict of interest. The authors alone are responsible for the content and writing of the article.

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